The World's Oldest Owl: A New Strigiform from the Paleocene of Southwestern Colorado

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ABSTRACT

Among the fossils recovered from a small, mid-Paleocene fissure filling in southwestern Colorado is the oldest known owl, *Ogygoptynx wetmorei,* new genus and species. This form, represented by a single tarsometatarsus, does not clearly belong in any of the known families of Strigiformes and may represent a new higher category of owls that provides a link between the Strigidae and the Tytonidae.

Introduction

In 1916, Walter Granger, following up the exploratory work of J. W. Gidley, examined sediments around Tiffany in southwestern Colorado and located several fossil-bearing areas that produced a moderately diverse mammalian fauna (Simpson, 1935). This assemblage became important in the definition of a North American land mammal age, the Tiffanian (Wood, et al., 1941). Among the bones found by Granger was a small avian tarsometatarsus. The following paper describes this fossil and considers its relationships.

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Order STRIGIFORMES

Family incertae sedis

Ogygoptynx, new genus

TYPE-SPECIES.—*Ogygoptynx wetmorei,* new species.

DISTRIBUTION.—Known only from the Tiffanian (mid-Paleocene) of Colorado.

DIAGNOSIS.—See Table 1.

Characters differing from the Strigidae but similar to the Tytonidae (including the Phodilinae): tarsometatarsus lacking a supratendinal bridge on the proximal end (three strigids also lack this bridge; Ford, 1967); posterior metatarsal groove not separated from the proximal articular surface by a marked bony ledge; anterior metatarsal groove deep across the entire width of the shaft at the proximal end.

Characters differing from the Phodilinae and Strigidae but resembling the Tytoninae: tarsometatarsus elongate and slender; posterior metatarsal groove only slightly excavated, lacking a lateral wall near the proximal end.

Characters resembling the Phodilinae and inter-

TABLE 1.—Comparison of the tarsometatarsus in *Ogygoptynx* with several families and subfamilies of owls

Character	PROTOSTRIGIDAE	STRIGIDAE	TYTONINAE	PHODILINAE, *Phodilus badius*	*Ogygoptynx wetmorei*
PROXIMAL END					
Intercotylar prominence	–	Set back from anterior margin of proximal end, located midway between anterior and posterior margins	Occupies most anterior part of proximal end; protrudes anterior to cotyla	Occupies most anterior part of proximal end; protrudes anterior to cotyla	Occupies anterior margin of proximal end; not protruding anterior to cotyla
Anteroposterior width across intercotylar area	–	Narrow	Deep	Deep	Narrow
Groove lateral to intercotylar prominence	–	Distinct	Indistinct	Indicated slightly	Indicated moderately, intermediate between Strigidae and Phodilinae
Supratendinal bridge	–	Ossified in all but 3 species (see Ford, 1967)	Not ossified	Not ossified	Not ossified
Width of calcaneal canal	–	Wide	Narrow	Narrow	Wide?
Orientation of external cotyla	–	Directed laterally	Directed posteriorly	Directed posteriorly	Directed laterally
Degree of excavation of posterior metatarsal groove	–	Highly excavated	Slightly excavated	Highly excavated	Slightly excavated
Degree of separation of posterior metatarsal groove and proximal articular surface	–	Bony ledge separating groove from intercotylar area	No bony ledge present	No bony ledge present	No bony ledge present
Depth of anterior metatarsal groove near proximal end of tarsometatarsus	–	Deep only at inner part of supratendinal bridge	Deep across full width of proximal end, undercuts cotylar area	Deep across full width of proximal end, undercuts cotylar area	Deep across full width of proximal end, undercuts cotylar area
Lateral wall of posterior metatarsal groove	–	Present	Absent	Present	Absent
DISTAL END					
Relative distal extension of trochleae	Middle trochlea extends farther distal than inner	Middle trochlea extends farther distal than inner	Inner trochlea extends slightly more distal than middle	Middle trochlea extends slightly farther distal than inner	Inner trochlea extends much farther distal than middle
Groove on middle trochlea	Anterior part not noticeably grooved, blends smoothly into shaft	Anterior part noticeably grooved	Anterior part not noticeably grooved, blends smoothly into shaft	Anterior part with shallow groove	Anterior part not noticeably grooved, blends smoothly into shaft

TABLE 1.—Continued

Character	PROTOSTRIGIDAE	STRIGIDAE	TYTONINAE	PHODILINAE, *Phodilus badius*	*Ogygoptynx wetmorei*
Shape of outer trochlea in lateral view	Distal margin highly rounded	Distal margin flattened or slightly grooved	Distal margin strongly grooved	Distal margin strongly grooved	Distal margin moderately rounded
Curvature across trochleae in distal view	Highly curved; channel created by such curvature deep; outer trochlea only slightly curved (medially concave)	Moderately curved; channel created by such curvature shallow; outer trochlea moderately curved	Highly curved; channel created by such curvature deep; outer trochlea highly curved	Moderately curved; channel created by such curvature deep; outer trochlea highly curved	Highly curved; channel created by such curvature deep; outer trochlea only slightly curved
GENERAL					
Proportions of tarsometarsus	–	Variable, generally short, stout	Elongate, slender	Short, stout	Elongate, slender

mediate between the Strigidae and Tytoninae: shallow groove slightly lateral to the intercotylar prominence.

Characters differing from the Tytonidae but resembling the Strigidae: intercotylar area shallow anteroposteriorly, due in part to the intercotylar prominence not protruding anterior to cotylar margins; distal margin of outer trochlea in lateral view flattened and only slightly rounded, not grooved; outer trochlea in lateral view only slightly curved.

Characters differing from the Protostrigidae: distal margin of outer trochlea in lateral view flattened and only slightly, rather than greatly, rounded.

Characters within the Strigiformes unique to *Ogygoptynx:* proximal end in lateral view shaped like a parallelogram with unequal angles, not rectangular; outer trochlea in distal view not smoothly rounded but slightly grooved laterally, not tapering to a point but broadened posteriorly; anterior portion of shaft just proximal to middle trochlea elevated farther anteriorly than the remainder of the shaft, but distal portion of shaft medial to this region markedly planar and not rounded; inner trochlea decidedly more elongate than middle trochlea.

ETYMOLOGY.—From Greek, *Ogyges,* mythical king of Thebes, suggesting ancient or primeval, and *ptynx,* an owl.

Ogygoptynx wetmorei, new species

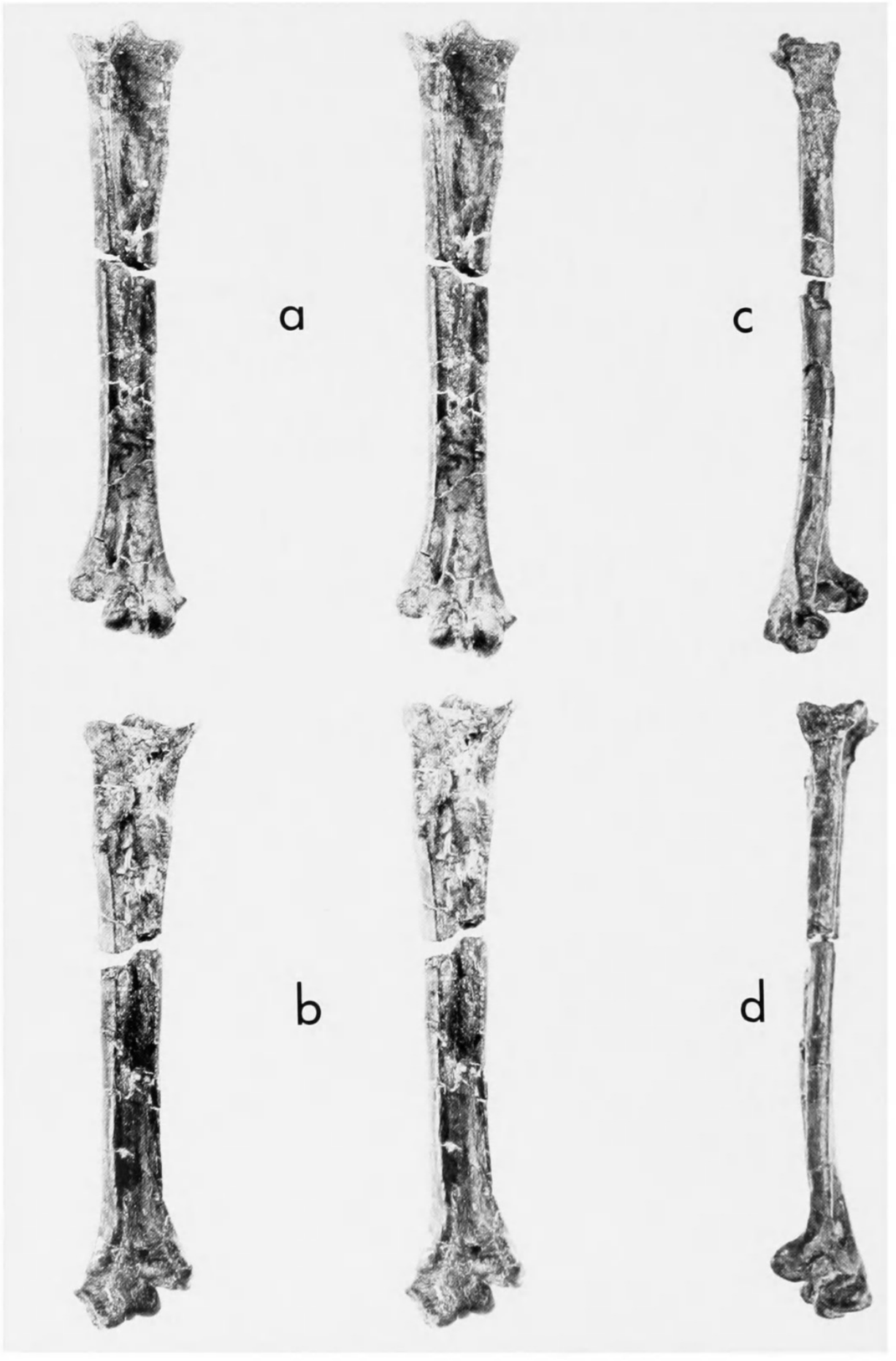
FIGURES 1, 2

HOLOTYPE.—Nearly complete right tarsometatarsus, AMNH 2653, missing only a small part of the calcaneal ridge and possibly some of the midshaft.

TYPE-LOCALITY AND STRATIGRAPHIC POSITION.—Mason Pocket near old Mason schoolhouse, northern drainage slope of the San Juan River, 6.5 to 8 km north of Tiffany, Section 20, T33N, R6W, La Plata County, southwestern Colorado. Found in "a small pocket of gray shale imbedded in a stratum of mottled purplish and brownish clay," which has been thought by some workers to be a fissure filling of some type. "Tiffany Beds," Tiffanian, mid-Paleocene in age (Simpson, 1935).

DIAGNOSIS.—As for the genus.

MEASUREMENTS.—Maximum width of proximal end, 9.0 mm; maximum depth of external cotyla, 4.9; maximum depth of internal cotyla, 5.1; maximum length from intercotylar prominence to distal end of attachment of tibialis anticus, 13.8; maximum width of distal end, 9.4; maximum width of inner trochlea, 4.2; maximum width of middle trochlea, 3.7; depth of internal border of inner trochlea, 3.2; depth of external border of inner trochlea, 3.6; depth of internal border of middle trochlea, 3.5; depth of external border of middle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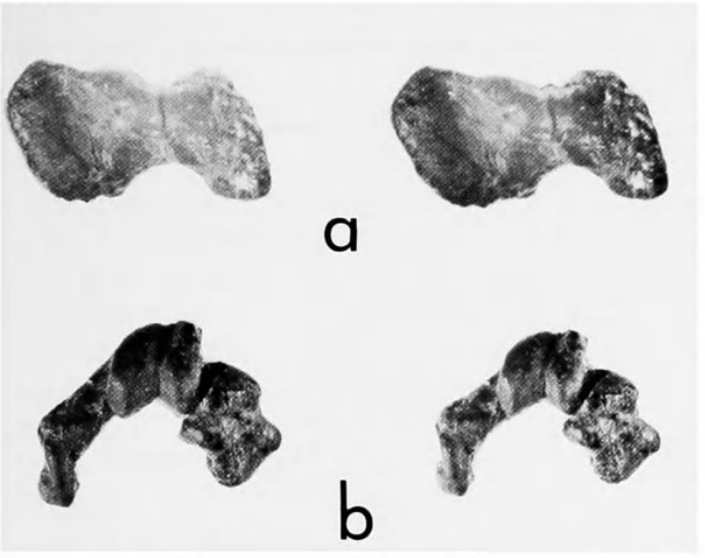

FIGURE 2.—*Ogygoptynx wetmorei,* new genus and species, stereo pairs of holotype right tarsometatarsus (AMNH 2653): *a,* proximal view; *b,* distal view. (× 3.)

trochlea, 3.9; depth of external border of outer trochlea, 4.0; overall length from intercotylar prominence to distal end of inner trochlea, at least 48.2.

ETYMOLOGY.—Named in honor of Dr. Alexander Wetmore, who has done much to further the knowledge of fossil owls as well as other birds.

COMPARISON WITH MODERN STRIGIFORMES

Ogygoptynx, known only from a tarsometatarsus, clearly belongs in the order Strigiformes as indicated by the broadly and deeply excavated anterior metatarsal groove; the single, slender calcaneal ridge; the shallow, narrow middle trochlea relative to the inner and outer trochleae; and the inner trochlea extending distally nearly as far as, or farther than, the middle trochlea.

Within the order, *Ogygoptynx* appears to be intermediate between the Tytonidae (including the Phodilinae; Ford, 1967) and the Strigidae, since it possesses a mosaic of character states of each of these families (Table 1).

One modern owl, *Phodilus* (subfamily Phodilinae), presently allocated to the Tytonidae (Ford, 1967), is to some degree a strigid-tytonid mosaic, but unlike *Ogygoptynx,* it is clearly most closely related to the Tytonidae. Strigid features seen in *Phodilus* include the deep proximal excavation of the posterior metatarsal groove, development of a lateral wall on the metatarsal groove near the proximal end, the moderately arched distal end, and the overall short, stout configuration of the tarsometatarsus. In most of its characters, however, *Phodilus* resembles the Tytonidae (Table 1), and thus, at least as evidenced by the tarsometatarsus, the allocation of *Phodilus* to the Tytonidae appears to be correct.

Because the tarsometatarsus of *Ogygoptynx* has such a mingling of strigid and tytonid character states, it cannot clearly be referred to any of the higher categories of modern Strigiformes.

COMPARISON WITH FOSSIL STRIGIFORMES

The mid-Paleocene *Ogygoptynx* is the earliest known owl (Figure 3) and it is certain that by the early Eocene a number of other strigiforms had made their appearance in North America. *Protostrix* and *Eostrix,* in the family Protostrigidae, are known from a number of localities in the American West (Wetmore, 1938; Brodkorb, 1971; Martin and Black, 1972; Rich, unpublished data). The distal end of the tarsometatarsus is known for both genera and thus they may be compared directly with *Ogygoptynx*. Unfortunately, the proximal end of the tarsometatarsus is not known in any of the protostrigids. The smallest genus, *Eostrix,* closely approximates *Ogygoptynx* in size, but along with *Protostrix* it differs in the relative distal extension of the inner and middle trochleae, in the shape of the outer trochlea, and in lacking those character states unique to *Ogygoptynx* (see "Diagnosis"). It is difficult to assess the value of many of these unique character states due to the partial crushing of the type of *O. wetmorei,* as well as to our incomplete knowledge of the tarsometatarsus in the Protostrigidae.

A number of other fossil owls, previously classified in the Strigidae (Brodkorb, 1971), show a mixture of strigid and tytonid character states suggesting that they may bear some relationship to *Phodilus* and *Ogygoptynx*. Brodkorb (1970) erected the genus *Paratyto* for *Bubo arvernensis* Milne-Edwards, from the lower Miocene of France, placing it in the "Phodilidae" on the basis of its

FIGURE 1.—*Ogygoptynx wetmorei,* new genus and species, holotype right tarsometatarsus (AMNH 2653): *a,* anterior view (stereo pair); *b,* posterior view (stereo pair); *c,* medial view; *d,* lateral view. (× 2.)

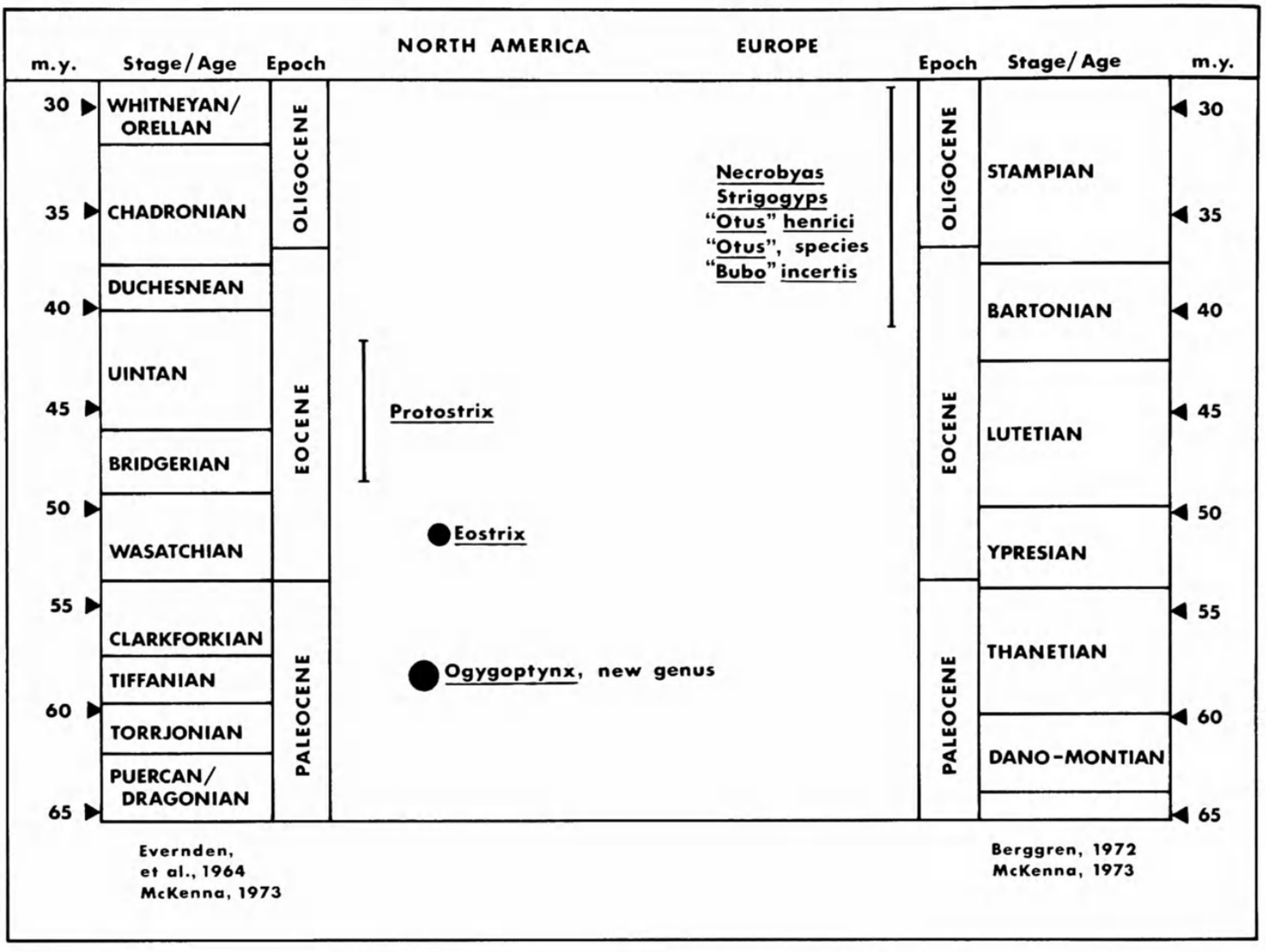

FIGURE 3.—Temporal distribution of early Tertiary owls.

lacking an ossified supratendinal bridge on the tarsometatarsus (as in the Tytoninae and Phodilinae) and on the stoutness of the tarsometatarsus (as in the Strigidae and Phodilinae). He did not mention, however, that three species of strigids also lack an ossified supratendinal bridge, nor did he discuss other characters useful in separating the Strigidae from the Tytonidae (including the Phodilinae). Thus, reexamination of *Paratyto* would be useful for determining whether it is a strigid or a phodiline.

At least four other European Tertiary owls (Figure 3), *Necrobyas harpax, N. rossignoli, "Otus" henrici,* and *"Otus"* sp. (PM 3120) (Milne-Edwards, 1892), are based entirely or in part on tarsometatarsi that are stout and also lack an ossified supratendinal bridge. The tarsometatarsus of *Ogygoptynx* is narrower than in these owls, with *N. harpax* exhibiting proportions most similar to those of the new Paleocene form. Another tytonid character seen in the four European owls and *Ogygoptynx* is the lack of a ledge proximal to the posterior metatarsal groove on the tarsometatarsus. The calcaneal groove is narrow in the four European owls, as in the tytonids, but is probably wide in *Ogygoptynx,* as in the strigids. In all of the above four species, the external cotyla points posteriorly, as in the Tytonidae, except in two specimens assigned to *"Otus" henrici* (PM 3117 and PM 3118) in which the cotyla points laterally as in the Strigidae and *Ogygoptynx*. The position of the intercotylar prominence in all four species is intermediate between that in the tytonids and strigids and very similar to that in *Ogygoptynx*. A fifth

owl, *Necrobyas edwardsi* Gaillard (1908, 1939), from the Tertiary of France, also based on a tarsometatarsus, was unavailable for study.

Other possibly intermediate genera of owls include *Prosybris* Brodkorb (1970) and *Lechusa* Miller (1956). *Prosybris,* from the lower Miocene of France, is placed with the Tytonidae but has a somewhat stouter tarsometatarsus than *Tyto;* like *Ogygoptynx,* its external trochlea is elongate. *Lechusa stirtoni,* based on a coracoid from the Pliocene of San Diego, California, was classified by Miller (1956) as a tytonid, although both he and Wetmore (in Miller, 1956:620) noted several strigid characters in this form. Miller stated, however, that *Lechusa* was definitely not a phodiline. Direct comparison between *Lechusa* and *Ogygoptynx* is impossible because of the lack of corresponding elements.

An extensive review of the above-mentioned fossil forms and some other European fossil owls is needed before the interrelationships of these, as well as modern forms, can be interpreted.

Ogygoptynx, the oldest known owl, does not clearly belong in any of the presently established families within the order Strigiformes (Protostrigidae, Tytonidae, Strigidae) and may well be distinct enough to rate separate familial rank. Until a thorough revision of the early Tertiary European owls is completed, however, we will refrain from making any such designation and only point out the mosaic nature of this early owl.

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